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ANNCR: THE VOICE OF AMERICA PRESENTS...SCIENCE NOTEBOOK...A SUMMARY OF OF EVENTS IN SCIENCE, MEDICINE AND TECHNOLOGY. EACH WEEK AT THIS TIME, WE BRING YOU REPORTS ON DEVELOPMENTS THAT MAY AFFECT OUR DAILY LIVES. WITH THE FIRST STORY, HERE IS YOUR SCIENCE EDITOR _____:

(SUPER TELESCOPE IN CHILE -- 3-2767 -- DOSA)

EDITOR: THE LARGEST OPTICAL TELESCOPE IN THE SOUTHERN HEMISPHERE HAS BEGUN FULL-TIME OPERATION ON A MOUNTAIN TOP IN CHILE. HERE IS _____ WITH A REPORT.

VOICE: THE FOUR-METER MIRROR OF THE HUGE NEW TELESCOPE AT THE CERRO TOLOLO INTER-AMERICAN OBSERVATORY IS SAID TO HAVE THE LIGHT-GATHERING POWER OF MORE THAN ONE-MILLION HUMAN EYES. LOCATED ON A TWENTY-TWO-HUNDRED METER HIGH MOUNTAINTOP ON THE WESTERN SLOPE OF THE ANDES MOUNTAINS, NEARLY FIVE-HUNDRED KILOMETERS NORTH OF SANTIAGO, THE GIANT INSTRUMENT WILL ALLOW ASTRONOMERS TO PROBE THE FRINGES OF THE UNIVERSE IN THE SOUTHERN SKIES.

THE TELESCOPE IS HOUSED IN A NEARLY FORTY-METER HIGH BUILDING WITH A FIVE-HUNDRED TON DOME THAT ROTATES ON THIRTY-TWO SETS OF WHEELS. THE INSTRUMENT ITSELF IS FOURTEEN METERS LONG AND ITS MOVABLE PORTION WEIGHS THREE-HUNDRED TONS. YET, IT IS SO DELICATELY BALANCED THAT ONE MAN CAN MOVE IT BY HAND.

VOICE:
(CONT'D)

DOCTOR VICTOR BLANCO, DIRECTOR OF THE CERRO TOLOLO INTER-AMERICAN OBSERVATORY, SAID THE TELESCOPE MARKS THE "OPENING OF A NEW ERA FOR THE STUDY OF SOUTHERN HEMISPHERE SKIES."

WITH ITS SIZE, PRECISE ENGINEERING AND NEAR-PERFECT OPTICS, THE NEW TELESCOPE GIVES ASTRONOMERS THEIR BEST LOOK YET AT OBJECTS, SUCH AS BRIGHT STAR CLUSTERS, OR THE MAGELLANIC CLOUDS, WHICH ARE VISIBLE ONLY FROM THE SOUTHERN HEMISPHERE.

THE TEN-MILLION DOLLAR TELESCOPE WAS PAID FOR BY THE U.S. NATIONAL SCIENCE FOUNDATION AND THE FORD FOUNDATION. IT IS OPERATED BY A GROUP OF AMERICAN UNIVERSITIES IN COOPERATION WITH THE UNIVERSITY OF CHILE IN SANTIAGO. A NEARLY IDENTICAL FOUR-METER TELESCOPE IS OPERATED BY THE SAME GROUP AT THE KITT PEAK NATIONAL OBSERVATORY IN ARIZONA. BOTH INSTRUMENTS ARE AVAILABLE FOR USE BY QUALIFIED ASTRONOMERS FROM ALL OVER THE WORLD AND, AT THE NEW TELESCOPE IN CHILE, PREFERENCE IS GIVEN TO LATIN AMERICAN STAR GAZERS.

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(NEW COMMUNICATIONS SATELLITE -- 3-2767--
HAVENS/AFRICAN DIV.)

EDITOR: A NEW COMMUNICATIONS SATELLITE, LAUNCHED MID-JANUARY FROM CAPE CANAVERAL, IS EXPECTED TO BECOME A PRACTICAL AND RELATIVELY INEXPENSIVE TOOL TO OVERCOME RURAL ISOLATION IN MANY PARTS OF THE DEVELOPING WORLD. VOA'S GEORGE HAVENS PREPARED THIS REPORT:

VOICE: A FUNDAMENTAL PROBLEM FACING MANY COUNTRIES TODAY IS HOW TO BRING EDUCATIONAL, CULTURAL AND SOCIAL INFORMATION TO THE ISOLATED RURAL AREAS WHERE THE GREAT MAJORITY OF PEOPLE

VOICE: LIVE. THIS IS AN ESPECIALLY VITAL QUESTION FOR THOSE
(CONT'D) COUNTRIES IN AFRICA, ASIA AND LATIN AMERICA, WHERE
TELEVISION WAS INTRODUCED ONLY RECENTLY.

THE ANSWER MAY BE FURNISHED BY THE NEWLY LAUNCHED
COMMUNICATIONS TECHNOLOGY SATELLITE, JOINTLY DEVELOPED
BY THE U.S. SPACE AGENCY AND THE CANADIAN DEPARTMENT OF
COMMUNICATIONS. SPACE AGENCY OFFICIAL LEONARD JAFFE SAYS,
THERE IS NO QUESTION THAT SATELLITES LIKE THIS WILL BRING
TELEVISION TO MANY AREAS OF THE WORLD WHICH DO NOT ALREADY
HAVE IT.

THE NEW SATELLITE TELEVISION SYSTEM COULD SERVE THE NEEDS
OF MANY SMALL NATIONS, SUCH AS THOSE IN AFRICA. THEY COULD
FORM REGIONAL GROUPS TO SHARE THE COSTS AND THE USE OF THE
SATELLITE. THE WAY HAS BEEN SHOWN FOR THEM BY THE A-T-S-SIX
APPLICATIONS TECHNOLOGY SATELLITE WHICH WAS LAUNCHED BY THE
UNITED STATES NEARLY TWO YEARS AGO. A-T-S-SIX IS CURRENTLY
BEING USED BY THE GOVERNMENT OF INDIA TO RELAY EDUCATIONAL
AND PUBLIC HEALTH TELEVISION PROGRAMS TO THOUSANDS OF
ISOLATED VILLAGES.

THE NEWLY LAUNCHED COMMUNICATIONS TECHNOLOGY SATELLITE IS
REGARDED A VAST IMPROVEMENT OVER A-T-S-SIX. ITS TELEVISION
SIGNAL CAN BE RECEIVED CLEARLY AND EASILY WITH A SIMPLE,
LOW-COST RECEIVER WHICH REQUIRES AN ANTENNA LESS THAN ONE
METER ACROSS.

VOICE: THE MANY PRACTICAL APPLICATIONS OF THE NEW SATELLITE
(CONT'D) TELEVISION SYSTEM WOULD INCLUDE TRANSMISSION OF IMPORTANT LECTURES BY LEADING EXPERTS TO RURAL SCHOOLS. IT WOULD ENABLE LIBRARY USERS IN SMALL TOWNS TO OBTAIN NEEDED REFERENCE MATERIALS FROM LARGE CENTRAL LIBRARIES QUICKLY. RURAL HEALTH CARE COULD BE IMPROVED BY LINKING MAJOR MEDICAL CENTERS VIA SATELLITE TELEVISION TO SMALL, LOCAL HEALTH FACILITIES.

THE POTENTIAL BENEFITS OF SATELLITE TELEVISION ARE ENORMOUS. THE TECHNOLOGY IS AVAILABLE AND IS BEING CONSTANTLY IMPROVED. AND, JUST AS THE AIRPLANE HAS ENABLED DEVELOPING COUNTRIES TO BYPASS THE CONSTRUCTION OF RAIL AND ROAD NETWORKS, SATELLITE TELEVISION CAN PROVIDE THEM WITH AN INSTANT COMMUNICATIONS NETWORK.

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(ANATOMY OF A STORM -- 3-2767 -- DOSA)

EDITOR: AN INTENSIVE STUDY OF CLOUD CONDITIONS IN THE VICINITY OF THE KENNEDY SPACE CENTER IN FLORIDA HAS LED TO NEW KNOWLEDGE ABOUT THE NATURE OF STORMS. _____ HAS DETAILS.

VOICE: LAST SUMMER, AS THE JOINT AMERICAN-SOVIET SPACE FLIGHT WAS ABOUT TO BE LAUNCHED, IT WAS ESSENTIAL THAT THE APOLLO ASTRONAUTS GO INTO ORBIT AT A PRECISELY DETERMINED TIME IN ORDER TO CATCH UP WITH THE SOVIET COSMONAUTS WHO WERE BLASTED INTO SPACE SEVERAL HOURS EARLIER. BUT AT THAT TIME OF THE YEAR -- AND OF THE DAY -- THE CAPE CANAVERAL AREA IS FREQUENTLY VISITED BY THUNDERSTORMS. CONSEQUENTLY, FOR WEEKS BEFORE THE LAUNCH, A SMALL FLEET OF RESEARCH AIRPLANES WERE FLYING ALL OVER CENTRAL FLORIDA TO LEARN AS MUCH AS POSSIBLE ABOUT THE NATURE OF THOSE STORMS SO THAT THE LIGHTNING HAZARD TO THE SPACECRAFT MIGHT BE REDUCED.

THE APOLLO-SOYUZ TEST PROJECT WAS A SUCCESS. AND IT YIELDED AN UNEXPECTED BENEFIT. SCIENTISTS OF THE U.S. NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION HAVE RECORDED THE ELECTRICAL LIFE HISTORIES OF THE FLORIDA THUNDERSTORMS. THUS, THEY HAVE TAKEN A GIANT STEP TOWARD RESOLVING THE QUESTION OF HOW GENERATE THEIR POWERFUL, LIGHTNING-PRODUCING ELECTRICAL CHARGES. THEIR MAIN FINDING WAS THAT THE ELECTRIFICATION OF A STORM BEGINS WHEN THE TOP OF A CLOUD REACHES A CERTAIN HEIGHT AND TEMPERATURE LEVEL. IN THE CASE OF THE FLORIDA STORMS, THIS HEIGHT IS ABOUT FIVE-THOUSAND METERS, AT MINUS TWO DEGREES, CELSIUS, TEMPERATURE.

AFTER REACHING THIS POINT, THE ELECTRICAL FIELD GENERATED BY THE STORM INCREASES VERY RAPIDLY AND IS ACCOMPANIED BY THE FIRST APPEARANCE OF ICE FORMATION AT THE TOP OF THE CLOUD. IT IS FOLLOWED ALMOST IMMEDIATELY BY THE FIRST LIGHTNING DISCHARGE AND INCREASED RAINFALL FROM THE BASE OF THE CLOUD, WHICH IS SOMETHING OVER THREE-HUNDRED METERS ABOVE GROUND AND HAS A TEMPERATURE OF APPROXIMATELY TWENTY DEGREES CELSIUS.

THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION SCIENTISTS PLAN TO STUDY THUNDERSTORMS IN OTHER PARTS OF THE COUNTRY TO DETERMINE WHETHER THE SAME DIFFERENCES IN HEIGHT AND TEMPERATURE ARE REQUIRED WITHIN A CLOUD COLUMN BEFORE IT STARTS TO BUILD UP ELECTRICITY AND THEN DISCHARGE IT IN THE FORM OF LIGHTNING.

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(THE READING MACHINE -- 3-2767 -- DOSA)

EDITOR: A MACHINE THAT CAN LOOK AT A PRINTED TEXT AND READ IT IN A LOUD VOICE WILL BE AVAILABLE TO THE BLIND IN LESS THAN FIVE YEARS. HERE IS _____ WITH THE STORY.

VOICE: SEVERAL SCIENTISTS AND ENGINEERS HAVE BEEN WORKING ON THE READING MACHINE FOR A NUMBER OF YEARS. SOME FIVE YEARS AGO, THEY BUILT A DEVICE WHICH CONVERTS THE IMAGE OF INDIVIDUAL LETTERS FROM A PRINTED TEXT INTO WEAK IMPULSES THAT IMPRINT THE SHAPE OF THE CORRESPONDING LETTERS ONTO THE SKIN ON THE FINGER OF THE BLIND. THIS DEVICE WAS A MAJOR STEP AWAY FROM THE BRAILLE SYSTEM OF RAISED LETTERS WHICH, TOO, THE BLIND READS WITH THE FINGERS.

THE LATEST DEVELOPMENT IN READING MACHINES WAS MADE POSSIBLE BY RECENT ADVANCES IN COMPUTER TECHNOLOGY AND MINIATURIZED ELECTRONICS. COMPUTER EXPERTS HAVE LEARNED HOW TO ANALYZE IN MINUTE DETAIL THE STRUCTURE OF THE LANGUAGE, THE PRONOUNCIATION OF INDIVIDUAL WORDS AND SENTENCES. ARMED WITH THIS KNOWLEDGE, THEY SET OUT TO BUILD A MACHINE THAT CAN READ ALOUD.

ONE SUCH MACHINE WAS BUILT BY A CAMBRIDGE, MASSACHUSETTS, COMPUTER FIRM. THE ENGINEERS USED COMMERCIALY AVAILABLE ELECTRONIC COMPONENTS, ALONG WITH A SPECIALLY DESIGNED COMPUTER PROGRAM. THE COMPUTER PROGRAM IS REALLY THE HEART OF THE ENTIRE SYSTEM BECAUSE IT ACTS LIKE THE SPEECH CENTER IN THE HUMAN BRAIN. IT RECOGNIZES THE WORDS IN THE PRINTED TEXT AND INSTRUCTS THE MACHINE TO SPEAK THOSE WORDS. THE FIRST MODEL, RECENTLY DEMONSTRATED FOR NEWSMEN AND OPERATED BY A BLIND PERSON, DOES NOT QUITE SOUND LIKE NORMAL HUMAN SPEECH, BUT IT CAN BE UNDERSTOOD. FURTHER IMPROVEMENTS IN ELECTRONICS AND COMPUTER PROGRAMMING WILL, PRESUMABLY, IMPROVE THE QUALITY.

VOICE: THE BLIND USER OF THE MACHINE CAN GO BACK A LINE, OR A PAGE,
(CONT'D) IF HE WANTS TO, JUST AS IF HE WERE SEEING AND READING A TEXT.
IF HE DOES NOT UNDERSTAND A WORD, HE CAN ORDER THE MACHINE
TO SPELL IT.

THE READING MACHINE, ACCORDING TO ITS INVENTORS, WILL BE VERY
EXPENSIVE AT FIRST, BUT IN FIVE YEARS OR SO, ITS PRICE WILL BE
COMPARABLE TO THAT OF AN AUTOMOBILE, AND IT WILL MAKE LIFE
MUCH EASIER FOR THE BLIND.

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(AN ANCIENT OZONE STORY -- 3-2767 -- DOSA)

EDITOR: MUCH IS BEING SAID THESE DAYS ABOUT THE THREAT TO THE OZONE
LAYER FROM MANMADE POLLUTANTS AND THE SUBSEQUENT RISKS TO
LIFE ON EARTH. ATMOSPHERIC SCIENTISTS SAY THAT, IN EFFECT,
WE ARE DEALING HERE WITH A RATHER ANCIENT STORY. HERE IS
_____ WITH SOME OF THE DETAILS.

VOICE: ONE OF THE CHIEF OBJECTIONS AGAINST THE SUPERSONIC -- FASTER-
THAN-SOUND -- AIRPLANE IS THAT, IN ADDITION TO BEING TOO NOISY,
ITS EXHAUST FUMES WOULD DESTROY THE OZONE LAYER WHICH PROTECTS
US FROM THE ULTRAVIOLET RADIATION OF THE SUN. THE GAS FREON,
USED IN AIR CONDITIONERS AND AEROSOL SPRAY CANS, IS REGARDED AS
ANOTHER THREAT TO THE OZONE.

SCIENTISTS OF THE U.S. NATIONAL CENTER FOR ATMOSPHERIC
RESEARCH POINT TO CIRCUMSTANTIAL EVIDENCE WHICH SUGGESTS THAT
ABOUT SEVEN-HUNDRED-THOUSAND YEARS AGO, MUCH OF THE
ATMOSPHERIC OZONE LAYER WAS DESTROYED AND LIFE ON EARTH
UNDERWENT A RADICAL CHANGE, WITH SOME SPECIES COMPLETELY
DISAPPEARING.

VOICE:
(CONT'D)

WITH NO SUPERSONIC TRANSPORT OR AEROSOL CANS TO BLAME FOR THAT ANCIENT DISASTER, THE U.S. ATMOSPHERIC SCIENTISTS LOOKED FOR, AND FOUND, ANOTHER EXPLANATION. DOCTORS GEORGE REED AND I.S.A. ISAKSEN, ALONG WITH DOCTORS PAUL CRUTZEN AND THOMAS HOLZER, REPORT IN THE BRITISH JOURNAL "NATURE" THAT A REVERSAL OF THE EARTH'S MAGNETIC FIELD WAS PROBABLY RESPONSIBLE FOR THE OZONE DESTRUCTION.

THE EARTH'S MAGNETIC FIELD TURNS AROUND ONCE EVERY SEVERAL-HUNDRED-THOUSAND YEARS. DURING THE TIME WHILE THE MAGNETIC NORTH POLE GRADUALLY SHIFTS TO THE SOUTH AND THE SOUTH POLE TO THE NORTH, THE STRENGTH OF THE MAGNETIC FIELD TEMPORARILY DIMINISHES AND IT IS UNABLE TO DEFLECT THE STEADY BOMBARDMENT OF EXTREMELY HIGHLY CHARGED PARTICLES FROM THE SUN AND THE UNIVERSE. THESE SOLAR WINDS AND COSMIC RAYS REACH THE TOP OF THE ATMOSPHERE AND TRIGGER A CHEMICAL REACTION -- MUCH LIKE THE SUPERSONIC TRANSPORT EXHAUST FUMES MIGHT -- WHICH DESTROYS THE OZONE LAYER.

ACCORDING TO THE FOUR AMERICAN SCIENTISTS, THE EARTH EVENTUALLY REBUILDS ITS MAGNETIC FIELD AND THE OZONE LAYER IS ALSO REPLENISHED BUT DURING THE "GEOLOGICAL TWINKLING OF EYE" WHILE THIS PROCESS IS TAKING PLACE, THE ULTRAVIOLENT RADIATION SETS OFF ALL KINDS OF MUTATIONS AND UPSETS THE EVOLUTIONARY PROCESSES ON EARTH. BUT, UNLESS MAN MANAGES TO DESTROY THE OZONE LAYER, WE ARE SAFE FOR A WHILE. SCIENTISTS ESTIMATE THAT THE NEXT REVERSAL OF THE MAGNETIC FIELD, WITH ALL ITS DIRE CONSEQUENCES, IS NOT DUE UNTIL SOME TIME BETWEEN THE FORTIETH AND FIFTIETH CENTURIES.

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_____, FOR MORE REPORTS ON DEVELOPMENTS THAT
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